

AMENDMENTS TO THE CLAIMS

The present listing of claims replaces all prior versions and listings of claims in the subject patent application:

Claim 1 (canceled)

Claim 2 (previously presented): A method for tracking a plurality of objects, comprising:

using remote scanning apparatus to repeatedly scan a region containing a set consisting of one or more moving objects and generating N sequential images or data sets of said region, a plurality of observations in said images or data sets providing positional information for objects in said set;

using a computer system to determine a plurality of tracks, at least one track for each object in said set;

using a computer system to determine a plurality of costs, wherein each cost is for assigning one of said observations to one of said tracks;

defining a linear programming problem:

$$\begin{aligned} & \text{Minimize} && \sum_{i_1 \dots i_N} c_{i_1 \dots i_N} z_{i_1 \dots i_N} \\ & \text{Subject To} && \sum_{i_2 i_3 \dots i_N} z_{i_1 \dots i_N} = 1 \quad (i_1 = 1, \dots, M_1) \\ & && \sum_{i_1 i_3 \dots i_N} z_{i_1 \dots i_N} = 1 \quad (i_2 = 1, \dots, M_2) \\ & && \sum_{i_1 \dots i_{p-1} i_{p+1} \dots i_N} z_{i_1 \dots i_N} = 1 \\ & && \quad (i_p = 1, \dots, M_p \text{ and } p = 2, \dots, N-1) \\ & && \sum_{i_1 i_2 \dots i_{N-1}} z_{i_1 \dots i_N} = 1 \quad (i_N = 1, \dots, M_N) \\ & && 0 \leq z_{i_1 \dots i_N} \leq 1 \text{ for all } i_1, \dots, i_N, \end{aligned}$$

wherein each $c_{i_1 \dots i_N}$ is included in said plurality of costs, each M_{i_i} , $i=1, \dots, N$, being one of: (a) a number of observations in an i^{th} image or data set of said N sequential images or data sets; (b) a sum of a number of tracks in said plurality of tracks, and a number of said observations in the i^{th} image or data set not assigned to one of said tracks; and (c) a number of tracks in said plurality of tracks;

using a computer system for solving said linear programming problem for values of $z_{i_1 \dots i_N}$ for each $i_1 \dots i_N$;

using a computer system for determining a value $z_{i_1 \dots i_N}$ in $\{0,1\}$ for each $i_1 \dots i_N$ corresponding to each $z_{i_1 \dots i_N}$, wherein said values $z_{i_1 \dots i_N}$ provide an optimal or near optimal solution to said linear programming problem; and

using a computer system to determine which one or more of the following actions will be taken based on said optimal or near-optimal assignment of said plurality of points to said plurality of tracks:

- sending a warning to aircraft or a ground or sea facility,
- controlling air traffic,
- controlling anti-aircraft or anti-missile equipment,
- taking evasive action,
- working on one of said one or more objects, and
- surveilling one of said one or more objects.

Claim 3 (previously presented): The method of claim 2, wherein the remote scanning apparatus for repeatedly scanning a region containing a set consisting of one or more moving objects comprises radar apparatus.